

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of:

Alexander Jan Carel DE VRIES et al.

Application No.: 10/080,714

Filed: February 25, 2002

Docket No.: 105531.01

For: METHOD OF MANUFACTURING A ROLLING ELEMENT BEARING WITH
IMPROVED ROLLING CONTACT SURFACES

BRIEF ON APPEAL

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GROUP 3600

Appeal from Group 3726

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I. INTRODUCTION

This is an Appeal from an Office Action mailed January 7, 2003, finally rejecting claims 1-2 and 4-6 of the above-identified patent application and the subsequent May 23, 2003 Advisory Action.

A. Real Party in Interest

The real party in interest in this Appeal in the present application is SKF Engineering & Research Centre B.V., by way of an Assignment recorded at Reel/Frame 10821/0053.

B. Statement of Related Appeals and Interferences

There are presently no appeals or interferences, known to Appellants, Appellants' representative or the Assignee, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

C. Status of Claims

Claims 1-2 and 4-6 are pending, stand rejected and are being appealed. Claims 1-2 and 4-6 are set forth in the attached Appendix of Claims. Claim 1 is an independent claim.

D. Status of Amendments

The Amendment filed on November 27, 2002 is the last Amendment which has been entered. Claim 3 was canceled and claims 1 and 5 amended. A Final Rejection was mailed on January 7, 2003 in reply to the November 27 Amendment. A Request for Reconsideration was then filed on April 17, 2003, requesting the rejection of claims 1-2 and 4-6 be withdrawn. The request was denied in an Advisory Action mailed May 23, 2003.

II. SUMMARY OF THE INVENTION AND APPLIED REFERENCES

A. Summary of the Invention

There are two types of bearings: sliding bearings and roller bearings. Sliding bearings act by one surface sliding relative to another surface. This results in sliding friction as shown in Fig. 1. On the other hand, roller bearings place rolling elements, such as balls or rollers,

between the two moving surfaces as shown in Fig. 2. This replaces sliding friction with rolling motion, which results in entirely different forces acting on the respective bearing types.

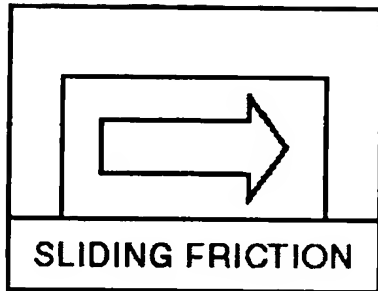


Figure 1

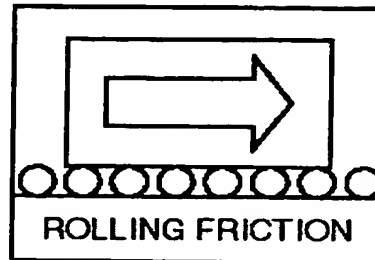


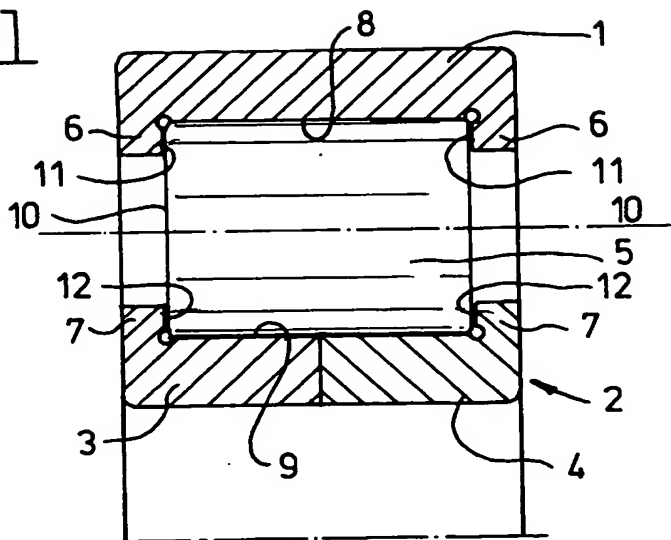
Figure 2

The invention is directed solely to the second type, roller bearings. In particular, the invention is directed to methods for manufacturing rolling element bearing (roller bearings) that provide sufficient lubrication capacity while also improving fatigue life properties.

The invention achieves improvements in fatigue strength and lubrication by a method of manufacture in which "at least one of the rolling surfaces and the raceways is provided with a topography comprising recesses which are generally isolated from each other by lands and which may contain a lubricant." Applicants' ¶[0013]. The recesses are formed with an average angle α defined by the intersection of the wall of the recess and an adjacent land of less than 5° . Applicants' ¶[0004] and [0020]. This is achieved by a process of shot peening of the surface.

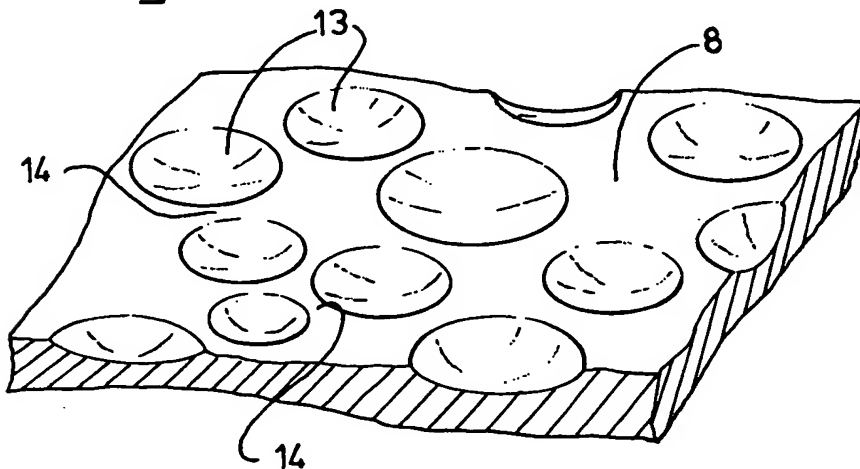
An exemplary embodiment of the invention provides a method of manufacture for a cylindrical roller bearing comprising an outer ring 1, an inner ring 2 consisting of two halves 3, 4, and a series of cylindrical rollers 5. Both the outer ring 1 and inner ring 2 have two integral flanges 6, 7. Between the flanges are raceways 8, 9. The cylindrical rollers 5 have flat end faces 10 which contact facing surfaces 11 and 12 of flanges 6, 7. See Applicants' ¶[0016]-[0018] and Applicants' Fig. 1 reproduced below.

fig -1



According to the exemplary embodiment, at least one of the surfaces of the rollers 5 and/or the rings 1, 2 is provided with a surface topography as shown in Applicants' Fig. 2 below in which a number of spherically shaped recesses 13 are provided. These recesses are achieved in an exemplary embodiment by shot peening glass beads. See ¶[0020].

fig -2



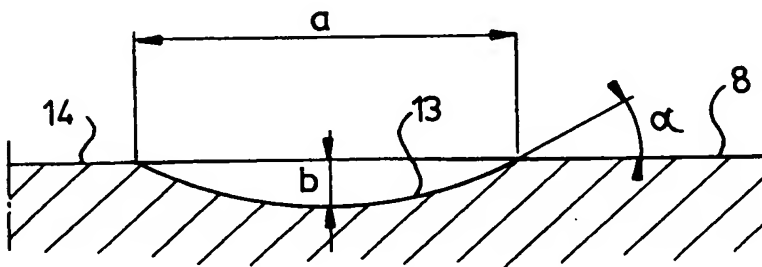
The recesses are generally isolated from each other by lands 14. The recesses 13 constitute small pockets in which oil may be trapped. When a rolling element overrolls with

the recesses 13, they become somewhat compressed, whereby the oil is expelled to achieve better lubrication. ¶[0020]. That is, this flattening causes an extra amount of lubricant to be expelled and fed into the contacting surfaces as an elasto-hydrodynamic lubricating film to separate the rolling surfaces.

In an exemplary embodiment, the maximum size a of the recesses in a direction parallel to the raceway is 100 μm and a maximum depth b is 4 μm , with an average depth of preferably 0.2 μm . ¶[0021]. In order to guarantee a smooth overrolling of the recesses 13 by the rolling elements, it has been found that the average angle α defined by the intersection of the wall of recess 13 and the adjacent land 14 is less than 5° , preferably 2° . See ¶[0004] and [0022].

Applicants believe that the geometry of the recess is of importance in obtaining good lubricating film at low speeds. In particular, it has been found advantageous to have the average angle α of less than 5° , preferably less than 2° to improve lubrication and improve fatigue life properties. See Applicants' [0007-0008]. See Applicants' Fig. 3 reproduced below.

fig - 3



B. The Claimed Invention

1. Claim 1 recites a method of manufacturing a roller element bearing comprising, *inter alia*, rolling surfaces of rolling elements (8) being provided with a topography comprising recesses (13) which are generally isolated by lands (14), the method comprising:

forming the recesses (13) by shot peening the at least one of the surfaces (8), wherein an average angle α between a wall of each recess (13) on the at least one surface (8) is less than 5 degrees.

2. Claim 2 further recites that the recesses have a maximum diameter of 100 micrometers and a minimum diameter of 14 micrometers.

3. Claim 4 depends from claim 1 and further recites using glass beads to do the shot peening.

4. Claim 5 depends from claim 4 and specifies that the diameter of each glass bead is about 200 micrometers.

5. Claim 6 depends from claim 1 and further provides the recesses with lubricant.

C. The Applied References

1. Japanese Patent Publ. No. 04-321816 to Toru

In Toru, a roller bearing element is formed to have "a number of tiny independent recesses of concave shape." See Abstract. However, as admitted in the final rejection, Toru fails to teach forming the recesses by shot peening and fails to teach forming of the recesses to have an angle of less than 5° as claimed.

2. U.S. Patent No. 5,592,840 to Miyasaka

Miyasaka relates to a method of forming a machined part to be subjected to a sliding action rather than a rolling action. That is, Miyasaka is directed to sliding bearings or other metal products that operate on sliding friction principles.

A shot peening process using glass beads is taught, but provided for other purposes. In particular, the particles being shot are taught to be "metal, ceramic or glass, having a hardness which is the same as or larger than that of the metal-product." Col. 3, lines 23-29. Each recess is taught to have a diameter of between 0.1 to 5 micrometers (Col. 3, lines 30-36) and may be formed using shot of between 20-200 micrometers, preferably between 28-125 micrometers. Col. 2, line 61 to Col. 3, line 12.

The Miyasaka specification is silent as to the specific resultant geometry of the recess and instead only generalizes that the recesses should be of a circular arc-shaped cross-section. Col. 3, lines 30-46 and col. 7, lines 10-25. This is taught to allow formation of oil droplets in the recesses. However, Figs. 3-4 shows actual magnified photographic details in which the recesses appear overlapping and show angled side walls with much more than the claimed 5°.

III. THE ISSUES ON APPEAL

1. Are claims 1, 4 and 6 properly rejected under 35 U.S.C. §103(a) as obvious over Toru in view of Miyakawa?
2. Is claim 2 properly rejected under 35 U.S.C. §103(a) as obvious over Toru in view of Miyakawa?
3. Is claim 5 properly rejected under 35 U.S.C. §103(a) as obvious over Toru in view of Miyakawa?

IV. GROUPING THE CLAIMS ON APPEAL

Each claim of this patent application on appeal is separately patentable, and upon issuance of a patent will be entitled to a separate presumption of validity under 35 U.S.C. §282. For convenience in the handling of this appeal, the claims are grouped as follows:

Group I, claims 1, 4 and 6.

Group II, claim 2.

Group III, claim 5.

Each of Groups I - III will be argued separately in the following arguments. The groups do not stand or fall together.

V. LAW

A. 35 USC §103(a) Obviousness

In rejecting claims under 35 USC 103, it is incumbent on the examiner to establish a factual basis to support the legal conclusion of obviousness. See, In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), including: (A) determining the scope and content of the prior art; (B) ascertaining the differences between the prior art and the claims in issue; (C) resolving the level of ordinary skill in the pertinent art; and (D) evaluating evidence of secondary considerations.

In rejecting claims, the Patent Office bears the initial burden of persuasion in establishing a *prima facie* case of obviousness. To achieve this, the Patent Office must show three criteria: a suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine teachings; a reasonable expectation of success; and that the prior art must teach or suggest all claimed limitations. See In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See also MPEP §2143.

Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal Inc. v. F-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir. 1988), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933

(Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note, In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). The mere fact that the prior art may be modified in the manner suggested by the examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. In re Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992).

All words in a claim must be considered in judging the patentability of that claim against the prior art. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). A showing of a suggestion, teaching, or motivation to combine the prior art references is an "essential evidentiary component of an obviousness holding." C.R. Bard, Inc. v. M3 Sys. Inc., 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed. Cir. 1998). This showing must be clear and particular, and broad conclusory statements about the teaching of multiple references, standing alone, are not "evidence." See Dembiczak, 175 F.3d at 1000, 50 USPQ2d at 1617. However, the suggestion to combine need not be express and "may come from the prior art, as filtered through the knowledge of one skilled in the art." Motorola, Inc. v. Interdigital Tech. Corp., 121 F.3d 1461, 1472, 43 USPQ2d 1481, 1489 (Fed. Cir. 1997).

"The inherent teaching of a prior art reference, a question of fact, arises both in the context of anticipation and obviousness. In re Napier, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995). The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). To rely on inherency, the examiner must "provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied art." In re Robinson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950 (Fed. Cir. 1999).

In applying 35 U.S.C. §103(a), the Patent Office must: (A) consider the claimed invention as a whole; (B) consider the references as a whole when determining whether the references suggest the desirability of making a combination; (C) consider the references without the benefit of impermissible hindsight consideration of Applicant's disclosure; and (D) use a reasonable standard of success as the standard from which obviousness is determined. Hodosh v. Block Drug Co., Inc., 786 F.2d 1136, 1143, 229 USPQ 182, 187 (Fed. Cir. 1986).

In this regard, prior art must be viewed prospectively and not retrospectively using the patent as a blueprint to reconstruct the invention by indiscriminately picking and choosing parts and bits from the prior art. See, for example, Grain Processing Corp. v. American Maize-Products Co., 840 F.2d 902, 907, 5 USPQ2d 1788, 1792 (Fed. Cir. 1988) ("Care must be taken to avoid hindsight reconstruction by using 'the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit.' "). See also In re Fine, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988) ("One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention."). This is because "[t]o imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." W. L. Gore Associates Inc. v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983), *cert. Denied*, 469 U.S. 851 (1984). Instead, the well-established rule of law is that each prior art reference must be evaluated as an entirety and all of the prior art must be evaluated "as a whole." See W.L. Gore, 721 F.2d at 1550, 220 USPQ at 311.

Patent case law is clear that in considering the differences, the question is not whether the differences themselves would have been obvious, but rather whether the claimed invention "as a whole" would have been obvious. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983). Distilling an invention down to the "gist" of the invention disregards the requirement of analyzing the subject matter "as a whole." W.L. Gore. In addition, it is irrelevant in determining obviousness that all or all other aspects of the claim may have been well known in the art. Medtronic, Inc. v. Cardiac Pacemakers, Inc., 721 F.2d 1563, 220 USPQ 97, 99-100 (Fed. Cir. 1983). The invention must be considered "as a whole."

In order to consider the invention "as a whole", the Examiner must consider the context in which the invention was made, problems solved by the invention and the like. See In re Antonie, 559 F.2d 618, 620, 195 USPQ 6, 8 (CCPA 1977) where it was held that in delineating the invention as a whole, one looks "not only to the subject matter literally recited in the claims...but also to the properties of the subject matter which are inherent in the subject matter and are disclosed in the specification." Also see In re Sponnoble, 405 F.2d 578, 585, 160 USPQ 237, 243 (CCPA 1969) where it was found that discovery of the source of a problem is also part of the "subject matter as a whole" inquiry. Moreover, a prior art reference must be considered in its entirety, i.e., as a whole, including portions that lead away from the claimed invention. W.L. Gore.

In order to fully answer the obviousness question and address the four Graham factors, the Examiner must determine who is "one of ordinary skill in the art." In considering the level of ordinary skill in the art, factors that may be considered include "(1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field." Environmental Designs,

Ltd. V. Union Oil Co., 713 F.2d 693, 696, 218 USPQ 865, 868 (Fed. Cir. 1983), *cert. Denied*, 464 U.S. 1043 (1984). The "importance of resolving the level of ordinary skill in the art lies in the necessity of maintaining objectivity in the obviousness inquiry." Ryko Mfg. Co. v. Nu-Star, Inc., 950 F.2d 714, 718, 21 USPQ2d 1053, 1057 (Fed. Cir. 1991). Thus, the Examiner must ascertain what would have been obvious to one of ordinary skill in the art at the time the invention was made, and not to the inventor, a judge or a layman." Environmental Designs.

B. Routine Experimentation

"Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). However, a particular variable must first be recognized as a "result-effective variable", i.e., a variable which achieves a recognized result before the determination of the optimum or workable ranges of said variable may be characterized as "routine experimentation." In re Antonie.

VI. ARGUMENT

A. Claims 1, 4 and 6 are not Obvious from Toru and Miyasaka

Claims 1, 4 and 6 stand rejected under 35 U.S.C. §102(a) over JP 04321816 to Toru in view of U.S. Patent No. 5,592,840 to Miyasaka.

The Examiner admits in the Final Rejection that Toru fails to teach a method of shot peening to form the recesses. The Examiner also admits in the Final Rejection that Toru fails to teach formation of recesses to have an average angle α between a recess wall and the surface of less than 5° as claimed.

To make up for this acknowledged deficiency, the Examiner asserts that these features would have been obvious from the teachings of Miyasaka. However, even if combined, the Office Action admits that Miyasaka is silent as to the angle feature, and instead relies on the position that "it would have been obvious, if not already, to one having ordinary skill in the

art at the time the invention was made to have set the average angle at a specific value as claimed since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art and it would appear that the average angle such as the one in Miyasaka would perform equally as well." See page 3, 1st full paragraph of the Final Rejection.

Applicants respectfully disagree and believe that the Examiner is impermissibly relying on hindsight consideration of Applicants' specification in making this rejection and has failed to meet his burden of making a prima facie case of obviousness.

Neither Toru nor Miyasaka teach, suggest, or render obvious all of the features recited in independent claim 1. In particular, none of the applied references teach or suggest a method of forming the recesses by shot peening at least one of its surfaces, wherein an average angle α between a wall of each recess on the at least one surface is less than 5 degrees.

Toru as discussed above discloses a cylindrical roller bearing 11 having "a number of independent tiny recesses of concave shape" arranged. See, e.g., the Abstract. However, the Office Action correctly acknowledges that Toru fails to teach or suggest forming of the recesses by shot-peening. Furthermore, Toru is absolutely silent about any of the recesses having an angle, let alone the recited range of less than 5 degrees. As such, Toru fails to recognize any criticality to the recess size, and in particular to the angular configuration of the recess' side wall. Because Toru fails to appreciate the problems overcome by the claimed invention and fails to appreciate the relationship the recess sidewall angle has on the resultant oil lubricating film formation or on fatigue life properties, there would have been no reasonable expectation of success for one of ordinary skill in the art to have experimented with different recess forming methods and resultant different structures.

The Office Action properly recognizes that experimentation by one of ordinary skill in the art is not "routine" unless a "result-effective variable" is first found in the prior art teachings. Because the Office Action fails to identify any teaching in Toru that would have enabled one of ordinary skill to recognize a result-effective variable, the asserted modifications are more than mere the alleged "routine experimentation" since they would be speculative at best. Moreover, the mere fact that the teachings could be modified does not make the modification obvious unless the prior art teaches the desirability of the modification.

Miyasaka fails to cure the deficiencies of Toru discussed above with respect to claim

1. Miyasaka discloses shot-peening a surface of a portion of a metal-product. However, Miyasaka is absolutely silent about a method of providing recesses by shot-peening such that the recesses have an angle less than 5 degrees.

Miyasaka discloses that a portion of a metal product is subjected to a sliding action. See, e.g., the Abstract of Miyasaka. One of ordinary skill in the rolling bearing art would have understood that a sliding action is not the phenomenon which is of importance in a rolling bearing; to the contrary, it is the ability to roll. That is because the problems which occur in a rolling element bearing are quite different from the problems which occur in a sliding bearing. For instance, in sliding bearings fatigue does not play a role. Further, no concentrated loads occur due to the fact that the surfaces of a sliding bearing are in sliding contact with each other over a large surface area.

In the roller bearings art, however, there is a drastic difference between the limited area of contact between a ball or roller, and the rest of the area which does not have such contact. Thus, the surfaces of the components of a roller element bearing are subjected to largely varying forces, which lead to fatigue problems. Moreover, the stresses which occur in a rolling element bearing are much higher than those which occur in a plain (sliding) bearing.

Thus, one skilled in the art who was devising a rolling bearing element would not have looked to the disclosure of Miyasaka which primarily relates to bearings sliding over surfaces.

One skilled in the art would have also understood that a "smooth" surface has favorable fatigue properties. Thus, the formation of indentations in a rolling element bearing surface (with the goal of containing oil), goes at the expense of fatigue properties thereof.

Accordingly, one of ordinary skill in the art would have been led away from using indentations for most roller bearing applications. Moreover, even if one were to look to the Miyasaka teachings, they do not teach a criticality to the size or cross-sectional profile of the recesses, other than to say that they are arc-shaped in cross-section. If anything, Figs. 3-4 show greatly increased angular sidewalls from the claimed range of less than 5°. Since Miyasaka is not concerned with problems of fatigue strength and does not appreciate the effect that the angular relationship of the sidewalls has on both lubrication and fatigue properties, a result-effective variable has not been established by the Patent Office.

Accordingly, without an appreciation of the problems faced by the Applicants or appreciation of the effect that sidewall angle has, modifications from the specific teachings of Miyasaka would be anything but "routine" since they would be purely speculative and would not have been suggestive from the teachings.

To the contrary, the claimed invention provides a favorable solution by recognizing such problems and recognizing that providing small indentations on at least one of the surfaces of the roller element bearing by the process of shot-peening that have indentation side walls of less than 5° may generate compressive stresses in the rolling element bearing surface, provide favorable lubrication conditions, and improve fatigue properties.

For at least the reasons discussed above, Applicants respectfully submit that the Patent Office has failed to make out a prima facie case of obviousness by failing to show or establish an inherency in the claimed range. Rather, to the contrary, the Office Action admits to a

difference and relies on "routine experimentation" for this omission. However, as admitted, experimentation has long been held to be other than routine unless a "result-effective variable" is first determined by the prior art such that optimization can be routinely determined. No such result-effective variable has been established.

Accordingly, claim 1 is not obvious from Toru or Miyasaka even if combined. The applied references also fail to anticipate the subject matter of dependent claims 4 and 6, which depend from claim 1 and are allowable for their dependence on claim 1 and for the additional features recited therein.

Withdrawal of the rejection under 35 U.S.C. §103(a) is therefore respectfully solicited.

B. Claim 2 is not Obvious from Toru in view of Miyasaka

Claim 2 stands rejected under 35 U.S.C. §102(a) over JP 04321816 to Toru in view of U.S. Patent No. 5,592,840 to Miyasaka.

The Examiner admits in the Final Rejection that Toru fails to teach a method of shot peening to form the recesses. The Examiner also admits in the Final Rejection that Toru fails to teach formation of recesses to have an average angle α between a recess wall and the surface of less than 5° as claimed. The Office Action also admits that Toru fails to teach the recited diameter range of 14 - 100 micrometers recited in claim 2.

To make up for this acknowledged deficiency, the Examiner asserts that these features would have been obvious from the teachings of Miyasaka. It is admitted that even Miyasaka fails to teach the specific recited diameter range. However, as with claim 1, the Office Action merely asserts that it would have been within the level of ordinary skill in the art to discover an optimum diameter.

Because the Office Action fails to identify any teaching in Toru or Miyasaka that would have enabled one of ordinary skill to recognize a result-effective variable, the asserted

modifications are more than mere "routine experimentation" since they would be speculative at best. As stated, the fact that a modification is possible does not render the change obvious. Moreover, it is the claims "as a whole" that must be looked at, not just the differences when determining obviousness.

As stated previously, Miyasaka fails to appreciate the relationship of the sidewall angle. Moreover, Miyasaka teaches away from the claimed diameter range by specifying a diameter range of 0.1 - 5 micrometers that is substantially smaller than claimed. When read "as a whole" this teaches away from the claimed combination of features (diameter plus angle plus others) recited in claim 2. Further, because the Office Action fails to identify any teaching in Toru or Miyasaka that would have enabled one of ordinary skill to recognize a result-effective variable, the asserted modifications are more than mere "routine experimentation" since they would be speculative at best.

Accordingly, claim 2 is not obvious from Toru or Miyasaka even if combined. Withdrawal of the rejection under 35 U.S.C. §103(a) is therefore respectfully solicited.

C. Claim 5 is not Obvious from Toru in view of Miyasaka

Claim 5 stands rejected under 35 U.S.C. §102(a) over JP 04321816 to Toru in view of U.S. Patent No. 5,592,840 to Miyasaka.

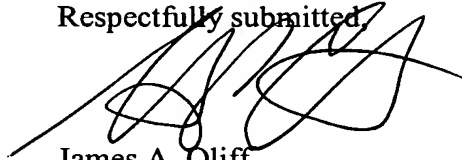
As discussed above, both Toru and Miyasaka fail to teach or suggest the recited 5° angle feature or that such a sidewall angle is a result-effective variable. As such, the invention is not obvious. Moreover, even though Miyasaka teaches using glass beads up to 200 micrometers in size, he fails to teach use of such a bead to form the recited angular sidewall feature. As such, dependent claim 5 is not obvious from Toru and/or Miyasaka since each and every feature of claim 5 is not met by the combination. Withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully solicited.

VII. CONCLUSION

For at least the reasons discussed above, it is respectfully submitted that Claims 1-2, and 4-6 contain patentable subject matter and are distinguishable from the teachings of Toru and Miyasaka.

Appellant respectfully requests this Honorable Board to reverse the final rejection of the claims and return the application to the Examiner to pass this case to issue.

Respectfully submitted,



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Enclosures:

Appendix of Claims 1-2 and 4-6

APPENDIX OF CLAIMS

Current Claims:

1. (Previously Presented) A method of manufacturing a roller element bearing comprising an inner ring, an outer ring, and a series of rolling elements, a rolling surface of each rolling element in contact with a raceway surface formed in each of the inner and the outer rings, at least one of the raceway surfaces of the inner and outer rings and the rolling surfaces of the rolling elements being provided with a topography comprising recesses which are generally isolated by lands, the method comprising:

forming the recesses by shot peening the at least one of the surfaces,
wherein an average angle α between a wall of each recess on the at least one surface is less than 5 degrees.

2. (Original) The method of claim 1, further comprising forming the recesses to have a maximum diameter of 100 micrometers and a minimum diameter of 14 micrometers.

4. (Original) The method of claim 1, further comprising using glass beads to do the shot peening.

5. (Previously Presented) The method according to claim 4, wherein the diameter of each glass bead is about 200 micrometers.

6. (Previously Presented) The method of claim 1, further comprising providing the recesses with lubricant.